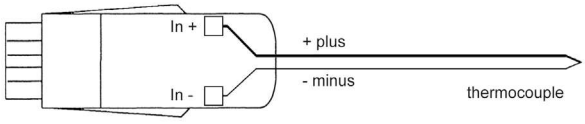
Digital ALMEMO® D7 measuring connector for thermocouple sensors of type K, N, T, J, R, S, B, E

ALMEMO® D7

Measure dynamic temperature changes with up to 100 measurement operations per second.
One single connector for different thermocouple types (programmable).
Optimal linearization accuracy of the thermocouple characteristic by calculation methods as per the DIN IEC 584.
Increased accuracy thanks to multi-point adjustment of the thermocouple sensor during calibration. For current measuring instruments ALMEMO® V7, i.a. the precision measuring instruments ALMEMO® 710 or ALMEMO® 202-S.



Technical data and functions

- The digital ALMEMO® D7 measuring connector for thermocouples can be used for a variety of thermocouple types. Once connected, the thermocouple type is programmed via the ALMEMO® V7 measuring instrument.
- The range for thermocouple type E. For use at lowest temperatures.
- The thermocouple is connected via 2 screw terminals integrated in the measuring connector. Every measuring connector has an integrated temperature sensor directly in the screw terminals for measurement and automatic compensation of the cold junction temperature.
- The input of the ALMEMO® D7 measuring connector is galvanically isolated from the ALMEMO® V7 measuring instrument. Therefore the connected thermocouple sensor is galvanically isolated from the other connected ALMEMO® sensors as well.
- The digital ALMEMO® D7 measuring connector operates with its own integrated A/D converter. The linearization of the thermocouple characteristic is calculated using method in compliance with DIN IEC 584 (not an approximation).
- For measuring dynamic temperature changes, the ALMEMO® D7 measuring connector operates at a fast conversion rate. The measuring rate is determined exclusively by the integrated A/D converter.
- On the ALMEMO® V7 measuring instrument all D7 measuring connectors operate in parallel - each at its own measuring rate. The measuring instrument`s very short scan cycle is determined by the measuring rates of the D7measuring connectors - nearly irrespective of their number. The ALMEMO® V7 measuring instrument saves the measured values; the measuring software WinControl displays them graphically.
- The overall accuracy of the measuring operation is unaffected by the presence of an ALMEMO® V7 display device / data logger. In case the measuring chain - consisting of a thermocouple sensor and the connected ALMEMO® D7 measuring connector - is calibrated, the measuring chain can be connected to any ALMEMO® V7 measuring device without any additional measuring uncertainties.
- At constant ambient conditions, an increased system accuracy is achieved by calibrating the thermocouple sensor using multi-point adjustment.
- To designate a sensor it is possible to program comments with up to 20 characters.

Technial data

Sensor type:	Thermocouple type: K, N, T, J, R, S, B, E
Measuring input:	galvanically isolated, dielectric strength 50V
Measuring ranges:	K -200.0 to +1370.0 °C N -200.0 to +1300.0 °C J -210.0 to +1100.0 °C E -270.0 to +800.0 °C T -200.0 to +400.0 °C S -50.0 to +1760.0 °C R -50.0 to +1760.0 °C B +250.0 to +1820.0 °C K2 -200.00 to +1370.00 °C N2 -200,00 to +1300,00 °C
Resolution:	0.1 K* respectively 0.01 K for measuring range K2 / N2
Conversion rate:	2.5*, 10, 50, 100 mops
Linearization	calculation method (not an approximation)

System accuracy at conversion rate 10 mops:	
type K, K2, N, N2, J, T	±0.2K ±0.02% of measured value
type E	±0.1K ±0.02% of measured value
type R, S, B	±0.8K ±0.02% of measured value
Temperature drift	0.003 %/K (30 ppm)
Cold junction compensation sensor:	NTC 10K at 25°C
Cold junction compensation effective in the range -10 °C to +60 °C:	-30°C to +100°C
System accuracy:	±0,2K ± 0,01K/°C
Nominal temperature:	23 °C ± 2 K
Supply voltage:	6, 9, 12 V from ALMEMO® device
Current consumption:	approx. 5 mA
Environmental conditions	see page 16 onwards

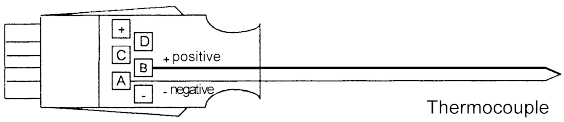
* Factory setting. The desired measuring range can be programmed on the ALMEMO® V7 device..

Types: **Order no.**

ALMEMO® D7 measuring connector for thermocouples.Fast measuring rate. Integrated galvanic isolation. **ZTD700FS**

Input connectors for thermocouples

ALMEMO® Connector for Thermocouple Types K, N, J, T



Variants (with thermal material)			Order no.
Model	Meas. Range	Resolution	
NiCr-Ni (K)	–200.0 to +1370.0°C.	0.1 K	**ZA9020FS**
NiCroSil-NiSil (N)	–200.0 to +1300.0°C.	0.1 K	**ZA9021FSN**
Fe-CuNi (J)	–200.0 to +1000°C.	0.1 K	**ZA9021FSJ**
Cu-CuNi (T)	–200.0 to +400°C.	0.1 K	**ZA9021FST**

ALMEMO® measuring module for thermocouples, types K, J, T, electrically isolated, up to 1000 V Type ZAD 950 AB

- Electrically isolated measurement of thermocouples (in particular bare thermo-wire types) on live parts
- Digital transfer of measured values to the ALMEMO® measuring instrument
- Connecting cable, fitted with ALMEMO® plug

Technical data

Sensor	Thermocouple	
Measuring range		
ZAD950ABK	NiCr-Ni (K)	-200 to 1370 °C
ZAD950ABJ	Fe-CuNi (J)	-200 to 1000 °C
ZAD950ABT	Cu-CuNi (T)	-200 to 400 °C
Resolution	0.1 K	
Linearization accuracy	±0.05 K ±0.05 % of measured value	
Precision class	C (see page 16)	
Measuring rate	2.5 measurements/sec.	

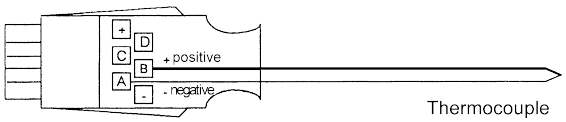
Electrical isolation	1 kV DC/AC permanent, 4 kV for 1s
Sensor connection	4-mm safety sockets and safety plugs (with screw terminals)
Power supply	6 to 13 VDC via ALMEMO® device
Current consumption	approx. 30 mA
Connecting cable	1.5 meters with ALMEMO® plug
Housing	Dimensions (LxWxH) 127x83x38mm, ABS (acrylonitrile butadiene styrene)

Types:	Order no.
ALMEMO® measuring module for NiCr-Ni (K), including 1.5 meters ALMEMO® connecting cable	**ZAD950ABK**
ALMEMO® measuring module for Fe-CuNi (J) including 1.5 meters ALMEMO® connecting cable	**ZAD950ABJ**
ALMEMO® measuring module for Cu-CuNi (T) including 1.5 meters ALMEMO® connecting cable	**ZAD950ABT**

Please note : thermocouple must be ordered extra; e.g. thermo-wires see Chapter Temperature

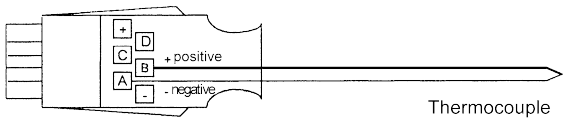
DAkkS- or Factory calibration KE90xx, electrically, for digital measuring module, see chapter „Calibration certificates“.
DAkkS calibration meets all the requirements regarding test resources laid down in DIN EN ISO/IEC 17025.

ALMEMO® Connector for Thermocouple Types U, L, S, R, B, AuFe-Cr



Types			Order no.
Model	Meas. Range	Resolution	
Cu-CuNi (U)	–200.0 to +600.0°C	0.1 K	**ZA9000FSU**
Fe-CuNi (L)	–200.0 to +900°C.	0.1 K	**ZA9000FSL**
PtRh10-Pt (S)	0.0 to +1760.0°C	0.1 K	**ZA9000FSS**
PtRh13-Pt (R)	0.0 to +1760.0°C	0.1 K	**ZA9000FSR**
PtRh30-PtRh6 (B)	+400.0 to +1800.0°C	0.1 K	**ZA9000FSB**
AuFe-Cr (A)	–270.0 to +60.0°C	0.1 K	**ZA9000FSA**

ALMEMO® Connector with integrated cold junction sensor for all thermocouples



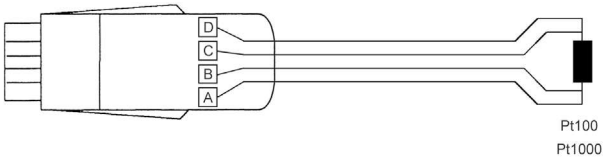
For especially exacting applications demanding the highest possible level of precision or performed under unfavorable conditions (e.g. subject to thermal irradiation)
Programming:
1st channel, NTC, integrated cold junction sensor, resolution 0.01 K
2nd channel, thermocouple, resolution 0.1 K; please specify type !

Types:			Order no.
Model	Meas. Range	Resolution	
NiCr-Ni (K)	–200.0 to +1370.0°C.	0.1 K	**ZA9400FSK**
NiCroSil-NiSil (N)	–200.0 to +1300.0°C.	0.1 K	**ZA9400FSN**
Fe-CuNi (L)	–200.0 to +900°C.	0.1 K	**ZA9400FSL**
Fe-CuNi (J)	–200.0 to +1000°C.	0.1 K	**ZA9400FSJ**
Cu-CuNi (T)	–200.0 to +400°C.	0.1 K	**ZA9400FST**
Cu-CuNi (U)	–200.0 to +600.0°C	0.1 K	**ZA9400FSU**
PtRh10-Pt (S)	0.0 to +1760.0°C	0.1 K	**ZA9400FSS**

Input connectors for Pt100

Digital ALMEMO® D7 measuring connector for Pt100 / Pt1000 temperature sensor

High-level resolution of 0.01 K across the entire measuring range up to 850 °C
Linearization of the Pt100 / Pt1000 characteristic calculated
Calibration with greater accuracy by subjecting the temperature sensor to multi-point adjustment
Only for latest ALMEMO® V7 measuring instruments, including ALMEMO® 500, 710, 809, 202-S, 204.



The new ALMEMO® D7 measuring connector provides even greater precision!

Technical data and functions

- The digital ALMEMO® D7 measuring connector uses its own integrated A/D converter. It provides a high-level resolution of 0.01 K across the entire measuring range up to 850 °C. Linearization of the Pt100 / Pt1000 characteristic is calculated in compliance with DIN IEC 751 (not an approximation).
- The overall accuracy of the measuring operation is unaffected by the presence of an ALMEMO® V7 display device / data logger. The whole measuring chain, comprising e.g. a Pt100 / Pt1000 sensor and the connected ALMEMO® D7 measuring connector, can be calibrated end-to-end. Calibration can be performed with greater accuracy by subjecting the temperature sensor to a process of multi-point adjustment.
- The measuring rate is determined entirely and exclusively by the integrated A/D converter. On the ALMEMO® V7 measuring instrument all D7 measuring connectors operate in parallel at their own measuring rate. The measuring instrument‘s very short scan cycle is determined by the measuring rates of the D7 measuring connectors - irrespective of their number.
- Sensor identification can be programmed with designations up to 20 characters in length.

Technical data

Sensor type	Pt100, 4 conductors or Pt1000, 4 conductors
Measuring input	electrically interconnected with the power supply (ALMEMO® device ground)
Measuring range	-200 to +850 °C
Resolution	0.01 K
Conversion rate	10 mops
Measuring current Pt100 Pt1000	 approx. 1 mA approx. 0.1 mA

Linearization	calculated (not an approximation)
Accuracy Pt100 Pt1000	 0.07 K +2 digits 0.08 K +2 digits
Nominal temperature	+22 °C ±2 K
Temperature drift	0.003 % / K (30 ppm) (resistance)
Supply voltage	from 6 V up. from ALMEMO® device (sensor supply voltage)
Current consumption	approx. 9 mA
Environmental conditions see page 16 onwards	

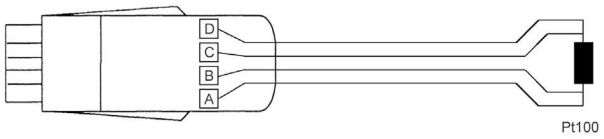
Types:

Type	Measuring range	Range	Resolution	Order no.
Pt100, 4 conductors	-200...+850 °C	DP04	0.01 K	**ZPD700FS**
Pt1000, 4 conductors	-200...+850 °C	DP14	0.01 K	**ZPD710FS**

Input connectors for Pt100

Digital ALMEMO® D6 measuring connector for Pt100 temperature sensor

Digital temperature sensors now also for ALMEMO® V6 measuring instruments, e.g. ALMEMO® 5690, 2690, 2590
Resolution of 0.01 K across the entire measuring range up to 400 °C
Linearization of the Pt100 characteristic calculated
Calibration with greater accuracy by subjecting the temperature sensor to multi-point adjustment



The new ALMEMO® D6 measuring connector provides even greater precision!

Technical data and functions

- The digital ALMEMO® D6 measuring connector uses its own integrated A/D converter. It provides a high-level resolution of 0.01 K across the entire measuring range up to 400 °C. Linearization of the Pt100 characteristic is calculated in compliance with DIN IEC 751 (not an approximation).
- The overall accuracy of the measuring operation is unaffected by the presence of an ALMEMO® display device / data logger. The whole measuring chain, comprising e.g. a Pt100 sensor and the connected ALMEMO® D6 measuring connector, can be calibrated end-to-end. Calibration can be performed with greater accuracy by subjecting the temperature sensor to a process of multi-point adjustment.
- The ALMEMO® D6 measuring plug operates with its own refresh rate. The measured values are scanned digitally at the conversion rate of the ALMEMO® measuring device.

Technical data

Sensor type	Pt100, 4 conductors or
Measuring input	electrically interconnected with the power supply (ALMEMO® device ground)
Measuring range	-200 to +400 °C
Resolution	0.01 K
Refresrate:	0,1 s
Measuring current Pt100	approx. 1 mA
Linearization	calculated (not an approximation)

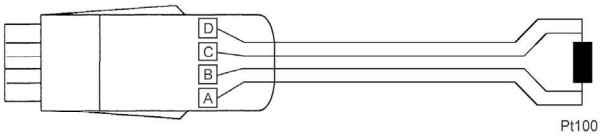
Accuracy Pt100	0.07 K +2 digits
Nominal temperature	+22 °C ±2 K
Temperature drift	0.003 % / K (30 ppm) (resistance)
Supply voltage	from 6 V up. from ALMEMO® device (sensor supply voltage)
Current consumption	approx. 9 mA
Environmental conditions	see page 16 onwards

Types:

Type	Measuring range	Resolution	Order no.
Pt100, 4 conductors	-200...+400 °C	0.01 K	**ZAD030FS**

Digital ALMEMO® D7 Precision measuring connector for Pt100 temperature sensor, resolution 0.001 K

Digital precision measuring connector with highest resolution of 0.001 K across the entire measuring range up to 400 °C
Linearization of the Pt100 characteristic calculated
Calibration with greater accuracy by subjecting the temperature sensor to multi-point adjustment
For ALMEMO® V7 measuring instruments, including ALMEMO® 500, 710, 809, 202-S, 204.



The new ALMEMO® D7 measuring connector provides even greater precision!

Digital precision resistance sensor Pt100 FPD723L0250A3D (example)

Technical data and functions

- The digital ALMEMO® D7 precision measuring connector becomes a reference sensor with highest accuracy when used with a suitable Pt100 sensor (see following page).
- The digital ALMEMO® D7 precision measuring connector uses its own integrated A/D converter. It provides a highest resolution of 0.001 K across the entire measuring range up to 400 °C.
- Linearization of the Pt100 characteristic curve in the measuring connector is calculated in compliance with DIN IEC 751 (not an approximation).
- The overall accuracy of the measuring operation is unaffected by the presence of an ALMEMO® V7 display device / data logger. The whole measuring chain, comprising e.g. a Pt100 sensor and the connected ALMEMO® D7 measuring connector, can be calibrated end-to-end. Calibration can be performed with greater accuracy by subjecting the temperature sensor to a process of multi-point adjustment.
- The measuring rate is determined entirely and exclusively by the integrated A/D converter. On the ALMEMO® V7 measuring instrument all D7 measuring connectors operate in parallel at their own measuring rate. The measuring instrument's very short scan cycle is determined by the measuring rates of the D7 measuring connectors - irrespective of their number.
- Sensor identification can be programmed with designations up to 20 characters in length.

Technical data

Sensor type	Pt100, 4 conductors
Measuring input	electrically interconnected with the power supply (ALMEMO® device ground)
Measuring range	-200 to +400 °C
Resolution	0.001 K
Conversion time:	3.4 seconds
Measuring current	approx. 1 mA
Linearization	calculated (not an approximation)

Accuracy	± 0.015K ± 2 digits
Nominal temperature	+22 °C ±2 K
Temperature drift	0.003 % / K (30 ppm) (resistance)
Supply voltage	starting at 6 V from ALMEMO® device (sensor supply voltage)
Current consumption	approx. 9 mA
Ambient conditions see from page 16	

Types:

Type	Measuring range	Resolution	Order no.
Pt100, 4 conductors	-200...+400 °C	0.001 K	**ZPD730FS**

Note on suitable sensors:
The sensor determines the accuracy, stability, hysteresis and long-term stability of the measuring chain consisting of sensor and digital connector. For the sensor, the following must be taken into account:
- The type of Pt100 sensor element determines, among other things, the achievable measurement uncertainty / stability.
- The design (sensor diameter, installation of the sensor element, powdered or with thermal paste) influences the self-heating and the hysteresis for the measurement uncertainty.

The self-heating must be included in the measurement uncertainty: If the self-heating is NOT known for the sensor design at hand, a lump sum must be charged.

Example: For a sufficiently long sheath element, an amount of 17 mK is recommended. In comparison: For the Ahlborn precision probe FPA923/FPD723 the self-heating was determined and is included in the measurement uncertainty with typ. 2 mK.
The hysteresis must be described in addition to the measurement uncertainty:
If the hysteresis is not determined, a lump sum of up to 0.2 % of the span is recommended in international regulations.
Example: Calibration range 0 to 400 °C, hysteresis lump sum up to 0.8 K or calibration range 0 to 100 °C up to 0.2 K (200 mK).

Digital precision resistance sensor Pt100 up to 400 °C with resolution of 0.001 K as reference sensor, with ALMEMO® D7 connector for ALMEMO® V7 measuring devices / data logger

Digital precision resistance sensor with highest accuracy and linearity for temperature measurements in a wide temperature range. Application as reference probe for comparison measurements in research, development, quality assurance and production processes.
For ALMEMO® V7 measuring instruments: ALMEMO® 500, 710, 809, 202-S, 204.

Digital precision resistance sensor Pt100
FPD723L0250A3D (example)

Technical data

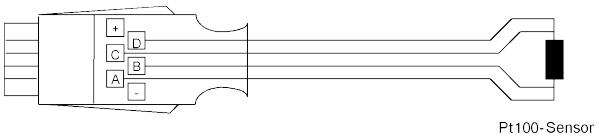
see chapter 07 Temperature

Types

	Order no.
Digital precision resistance sensor Pt100 as reference sensor, with cable and ALMEMO® D7 connector. Incl. DAkkS calibration certificate (2 temperature points at 0°C and 100°C incl. multi-point adjustment).	**FPD723L0250A3D**

Input connectors for Pt100

ALMEMO® Connector for Pt100 Sensors/Pt1000 Sensors



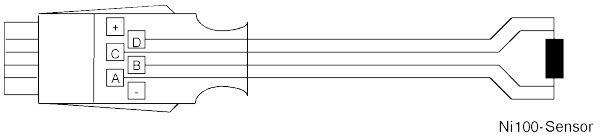
Pt100-Sensor

Types:

Model	Meas. Range	Resolution	Order no.
Pt100 4-conductor	–200.0 to +850.0°C	0.1 K	**ZA9030FS1**
Pt100 4-conductor	–200.0 to +400.0°C *	0.01 K	**ZA9030FS2**
Pt1000 4-conductor	–200.0 to +850.0°C *	0.1 K	**ZA9030FS4**
Pt1000 4-conductor	–200.0 to +400.0°C *	0.01 K	**ZA9030FS5**

* Data may vary depending on device; (see data sheet per device)

ALMEMO® Connector for Ni100 Sensors/Ni1000 Sensors

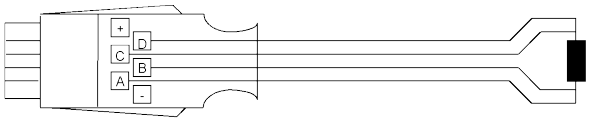


Ni100-Sensor

Types:

Model	Meas. Range	Resolution	Order no.
Ni100	–60.0 to +240.0°C	0.1 K	**ZA9030FS3**
Ni1000	–60.0 to +240.0°C	0.1 K	**ZA9030FS6**

ALMEMO® Connector for Resistance



Technical Data ZA9003SS4:

Connection	2-wire
Linearization accuracy:	±0,2 % ± 0,02 kOhm Linearization is saved in the ALMEMO® connector; (this is not available with ALMEMO® 2450, 8390)

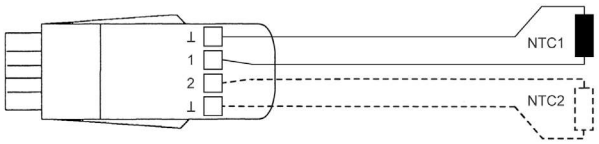
Types:

Model	Meas. Range	Resolution	Order no.
Ohm	0.00 to 500.00	0.01 Ω*	**ZA9003FS**
Ohm	0.0 to 5000.0*	0.1 Ω*	**ZA9003FS2**
kOhm	0 to 110.00 kOhm	0.01 kOhm	**ZA9003SS4**

* Data may vary depending on device; (see data sheet per device)

Digital ALMEMO® D6 measuring connector for temperature sensors NTC

High levels of precision and resolution 0.001 K across measuring range -20 to +65 °C
Linearization of the NTC characteristic - calculated using Galway Steinhart coefficients
Increased measured value accuracy - thanks to multi-point adjustment of the NTC sensor during calibration
For all ALMEMO® V6 and V7 measuring instruments, including ALMEMO® 2490 and ALMEMO® 202-S.



Technical data and functions

- The digital ALMEMO® D6 measuring connector uses its own integrated A/D converter. Linearization of the NTC characteristic is calculated using the Galway Steinhart coefficients (not an approximation). Across measuring range -20 to +65 °C this produces the very high resolution of 0.001 K.
- The digital temperature sensor reaches this high level of precision irrespective of any extension cables used and of any processing in the ALMEMO® display device / data logger. Overall accuracy is determined exclusively by the NTC sensor and the ALMEMO® D6 measuring connector. This increased measured value accuracy is achieved by subjecting the NTC sensor to multi-point adjustment during calibration.

With the ALMEMO® D6 measuring plug, customer-specific NTC sensors can be connected to the Almemo® system after the corresponding Steinhart-Hart coefficients have been configured via the sensor menu.
When using own sensors no additional adjustment of the connector is necessary.

Technical data

Sensor type	NTC type N
Measuring input	Electrically interconnected with the power supply (ALMEMO® device ground)
Measuring ranges	see variants
Resolution	see variants
Refresh rate	0.3 seconds for up to two channels
Linearization	Calculated (not an approximation)

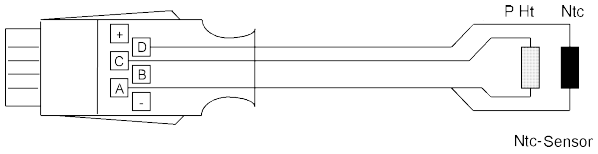
Accuracy	
Range DNtc / DNt2	±0.05 K at -50 to +100 °C
Range DNtc3	±0.02 K at -20 to +65 °C
Nominal temperature	23 °C ±2 K
Temperature drift	0.004 % / K (40 ppm)
Supply voltage	from 6 V up, from ALMEMO® device (sensor supply voltage)
Current consumption	approx. 4 mA
Environmental conditions	see page 16 onwards

Types:

Type / input	Measuring range	Range	Resolution	Order no.
NTC, 1 input	-50...+125 °C	DNtc	0.01 K	**ZAD040FS**
NTC, 2 inputs	-50...+125 °C	DNtc/DNt2	0.01 K	**ZAD040FS2**
NTC, 1 input	-20...+65 °C	DNt3	0.001 K	**ZAD040FS3**

Input connectors for NTC

ALMEMO® Connector for Ntc Sensors

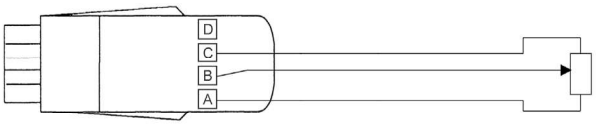


Types:			Order no.
Model	Meas. Range	Resolution	
Ntc Typ N	–50.0 to +125.0°C	0.01 K	**ZA9040FS**
2xNtc Typ N	–50.0 to +125.0°C	0.01 K no electrical isolation	**ZA9040FS2**

Input connectors for potentiometer

Digital ALMEMO® D7 measuring connector for potentiometric sensors (displacement transducers, etc.)

For displacement transducers and other potentiometric sensors
High resolution up to 200 000 digits
or fast conversion rate, resolution up to 10 000 digits.
Only for the latest ALMEMO® V7 measuring instruments, including ALMEMO® 500, 710, 809, 202-S, 204.



This new, innovative ALMEMO® D7 measuring connector enables high precision or fast conversion rate. The user can set the preferred configuration quickly and easily on the ALMEMO® V7 measuring instrument itself.

Technical data and functions

- The ALMEMO® D7 digital measuring connector operates with its own integrated A/D converter. Overall measuring accuracy is unaffected by the presence of an ALMEMO® V7 display device / data logger. The whole measuring chain, comprising e.g. a displacement transducer and the connected ALMEMO® D7 measuring connector, can be adjusted end-to-end.
- The measuring rate is determined exclusively by the integrated A/D converter. On the ALMEMO® V7 measuring instrument all D7 measuring connectors operate in parallel - each at its own measuring rate. The measuring instrument‘s very short scan cycle is determined by the measuring rates of the D7 measuring connectors - more or less irrespective of their number.
- For high resolutions and stable values, e.g. for precision displacement transducers, the ALMEMO® D7 measuring plug works with a reduced conversion rate. For fast processes, measurements can be taken at a higher conversion rate. The ALMEMO® V7 measuring device stores the measured values and the WinControl measuring software displays them graphically.
- The voltage drop is measured at the potentiometer. The 2-volt reference voltage is supplied via the ALMEMO® D7 plug.
- The sensor is scaled to the physical quantity (e.g. displacement in mm); this is performed via the ALMEMO® V7 device (on the device itself or using ALMEMO® Control software) - with zero-point adjustment and final value adjustment. The measured value‘s assigned units can be up to 6 characters in length. Sensor identification can be programmed with a comments text up to 20 characters in length.

Technical data

Sensor type	Potentiometer
Measuring input	Electrically connected to the power supply (ALMEMO® device ground)
Input range	-2 to +2 V
Display range, conversion rate:	see variants
Reference voltage	2 V

System accuracy	0.02 % ?*? ±2 digits
Nominal temperature	22 °C ±2 K
Temperature drift	0.003 % / K (30 ppm)
Supply voltage	from 6 V up, via the ALMEMO® device itself (sensor supply)
Current consumption	approx. 8 mA (without sensor)
Environmental conditions	see page 16 onwards

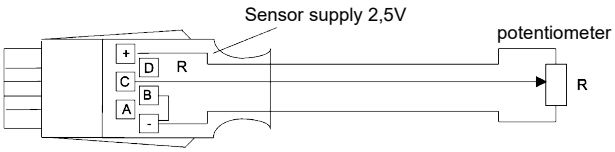
Types:

Range	Display range	Resolution	Conversion rate	Order no.
U24*	0...100 %	0.01 %	100 measurements/s	
or				
U25	0...200 000 digit	1 digit	10 measurements/s	**ZWD700FS**

*Delivery state. The desired measuring range can be programmed on the ALMEMO® V7 device.

Input connectors for potentiometer

ALMEMO® Connector for Potentiometer pickoffs



Technical Data

Sensor supply:	2.5 V
Temperature coefficient:	< 50 ppm/K

Types:

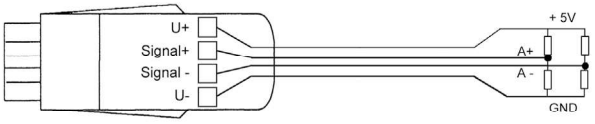
Model	Meas. Range	Resolution	Order no.
2.6 V DC Differenz	–2.6 to +2.6*	0.1 mV	**ZA9025FS3**

* Data may vary depending on device; (see data sheet per device)

Input connectors for measuring bridges

Digital ALMEMO® D7 measuring connector for bridge differential mV

For force transducers (tension / compression), torque transducers, or strain gauges
High resolution up to 200 000 digits
or fast conversion rate, resolution up to 50 000 digits.
Only for latest ALMEMO® V7 measuring instruments, including ALMEMO® 500, 710, 809, 202-S, 204.



The new ALMEMO® D7 measurement plug enables high precision or fast conversion rate applicable for a vast variety of measuring tasks.
The user can select the preferred configuration quickly and easily on the ALMEMO® V7 measuring instrument itself.

Technical data and functions

- The digital ALMEMO® D7 measuring connector uses its own integrated A/D converter. The overall accuracy of the measuring operation is unaffected by the presence of an ALMEMO® V7 display device / data logger. The whole measuring chain, comprising e.g. a force transducer and the connected ALMEMO® D7 measuring connector, can be calibrated end-to-end.
- The measuring rate is determined entirely and exclusively by the integrated A/D converter. On the ALMEMO® V7 measuring instrument all D7 measuring connectors operate in parallel at their own measuring rate. The measuring instrument's very short scan cycle is determined by the measuring rates of the D7 measuring connectors - irrespective of their number.
- For high resolutions and stable values, e.g. for precision force transducers, the ALMEMO® D7 measuring plug works with a reduced conversion rate. For fast processes, measurements can be taken at a higher conversion rate. The ALMEMO® V7 measuring device stores the measured values and the WinControl measuring software displays them graphically.
- Measurements are taken using a full bridge with a 4-conductor circuit. The bridge is powered from the ALMEMO® D7 plug.
- The sensor is scaled to its actual physical quantity (e.g. end value 1 kN with characteristic 2 mV / V); this is performed via the ALMEMO® V7 device (device itself or ALMEMO® Control software). - zero-point adjustment, - scaling of end value by entering characteristic mV / V or adjustment by loading the bridge with end value The assigned units can be up to 6 characters in length. Sensor identification can be programmed with designations up to 20 characters in length.

Technical data

Sensor type	Full bridge, 4 conductors
Bridge resistance:	at least 350 Ohm
Measuring input	electrically interconnected with the power supply (ALMEMO® device ground)
Input range	see variants
Display range, Conversion rate:	see variants
Bridge power supply	5 V Accuracy 0.01 % Temperature drift 10 ppm / K
System accuracy	0.02 % +2 digits at 10 measurements / second
Nominal temperature	+22 °C ±2 K
Temperature drift	0.003 % / K (30 ppm)
Supply voltage	from 6 V up. from ALMEMO® device (sensor supply voltage)
Current consumption	approx. 32 mA (without force transducer)
Environmental conditions	see page 16 onwards

Types:

Range	Input range	Display range	Conversion rate	Order no.
DMS1*	±29.3 mV	±200 000 digits	10 mops	
or DMS2	±29.3 mV	±50 000 digits	1000 mops	
or DMS3	±58.6 mV	±200 000 digits	10 mops	
or DMS4	±58.6 mV	±50 000 digits	1000 mops	**ZKD700FS**

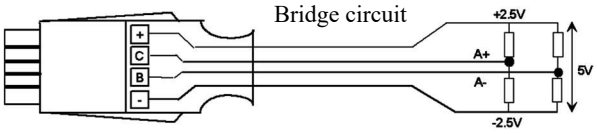
* Factory setting : The desired measuring range can be programmed on the ALMEMO® V7 device itself.

Option: Configuration of ALMEMO® D7 measuring connector; conversion rate 1000 mops, DMS2 (±29.3 mV) **OA9007PRM1000**

Input connectors for measuring bridges

ALMEMO® Connector for measuring bridges, millivolt / volt differential

With zero-symmetrical voltage supply of ±2.5 V stabilized from the ALMEMO® device



Technical Data

Sensor type:	Full bridge, 4 conductors
Bridge resistance:	at least 350 Ohm
Sensor supply	
Voltage U_E:	5V ± 0.05V
Temperature coefficient:	<50ppm/°C
Output current:	25 mA at U_G = 12 V 30 mA at U_G = 9 V 50 mA at U_G = 6 V
Ruhestrom:	approx. 3 mA
Energy saving	So long as the measuring point is not selected, the bridge voltage remains switched OFF.

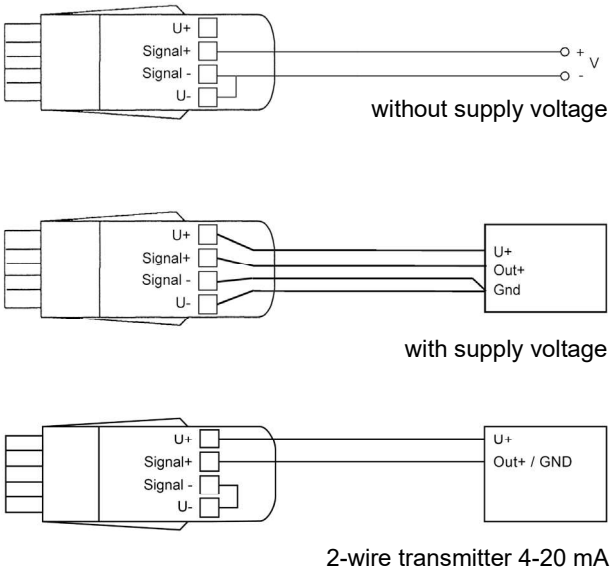
Types:

Model	Meas. Range	Resolution	Order no.
55mV DC	–10.0 to +55.0	1 µV	**ZA9105FS0**
26mV DC	–26.0 to +26.0	1 µV	**ZA9105FS1**
260mV DC	–260.0 to +260.0	10 µV	**ZA9105FS2**
2.6V DC	–2.6 to +2.6*	0.1 mV	**ZA9105FS3**

* Data may vary depending on device; (see data sheet per device)

Digital ALMEMO® D7 measuring connector for DC voltage differential (volt) / DC current differential (mA)

**High resolution up to 0.001 mV / 0.1 µA (200 000 digits)
or fast conversion rate, resolution up to 1 mV / 10 µA (2000 digits).
Only for latest ALMEMO® V7 measuring instruments, including ALMEMO® 500, 710, 809, 202-S, 204.**



The new ALMEMO® D7 measurement plug enables high precision or fast conversion rate applicable for a vast variety of measuring tasks.
The user can select the preferred configuration quickly and easily on the ALMEMO® V7 measuring instrument itself.

Technical data and functions

- The digital ALMEMO® D7 measuring connector uses its own integrated A/D converter. The overall accuracy of the measuring operation is unaffected by the presence of an ALMEMO® V7 display device / data logger. The measuring rate is determined entirely and exclusively by the integrated A/D converter. On the ALMEMO® V7 measuring instrument all D7 measuring connectors operate in parallel at their own measuring rate. The measuring instrument's very short scan cycle is determined by the measuring rates of the D7 measuring connectors - irrespective of their number.
- For high resolutions and stable values, e.g. in precision transmitters for pressure, the ALMEMO® D7 measuring plug works with a reduced conversion rate. For fast processes, measurements can be taken at a higher conversion rate. The ALMEMO® V7 measuring device saves the measured values and the WinControl measuring software displays them graphically.
- Measuring transducers without their own mains unit and needing a power supply are powered from the ALMEMO® D7 plug. Each signal is scaled to its actual physical quantity (e.g. pressure 25 bar at voltage 10 volts); the assigned units can be up to 6 characters in length. Sensor identification can be programmed with designations up to 20 characters in length.

Technical data

Measuring input	electrically interconnected with the power supply (ALMEMO® device ground)
Measuring range	see variants
Conversion rate, resolution	see variants
Overload	see variants
Internal resistance	see variants
Input current	100 pA
System accuracy	0.02 % +2 digits at 5 measurements / second

Nominal temperature	+22 °C ±2 K
Temperature drift	0.003 % / K (30 ppm)
Supply voltage	6 / 9 / 12 V, from ALMEMO® device (sensor supply voltage)
Current consumption	approx. 12 mA (without transducer)
Sensor supply	6 / 9 / 12 V, from ALMEMO® device ZED70xFSV15: 15±0,6 V, max. 50 mA at device voltage 12 V ZED70xFSV24: 24 ±1 V, max. 30 mA at device voltage 12 V
Environmental conditions	see page 16 onwards

Input connectors for DC

Types:

Measuring range	Resolution Conversion rate (mops)	Internal resistance	Overload	Order no.
-2.2...+2.2 Volt	0.01 mV, 5 mops* / 0.1 mV, 500 mops / 1 mV, 1000 mops	110 kOhm	±3 V	**ZED700FS**
-64...+64 mV -250...+250 mV*	0.001 mV, 5 mops*	5 GOhm	±2.8 V	**ZED700FS2**
-20...+20 Volt	0.1 mV, 5 mops* / 1 mV, 500 mops / 10 mV, 1000 mops	110 kOhm	±30 V	**ZED702FS** **ZED702FSV15**** **ZED702FSV24****
-60...+60 Volt	1 mV, 5 mops* / 10 mV, 500 mops / 10 mV, 1000 mops	103 kOhm	±60 V	**ZED702FS2**
-20...+20 mA	00.1 µA, 5 mops* / 1 µA, 500 mops / 10 µA, 1000 mops	100 Ohm	±28 mA	**ZED701FS** **ZED701FSV15**** **ZED701FSV24****

* Factory setting : The desired measuring range can be programmed on the ALMEMO® V7 device itself..
** Sensor supply see above: Technical data

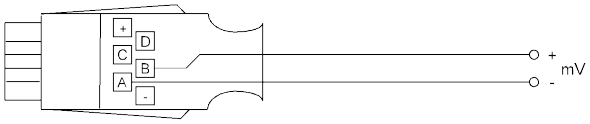
Option:

Configuration of ALMEMO® D7 measuring connector	
Conversion rate 500 mops	**OA9007PRM500**
Conversion rate 1000 mops	**OA9007PRM1000**

Accessories

	Order no.
Galvanic isolation up to 50 V for ALMEMO® D7 sensors. pluggable cabel, length = 0,2 m	**ZAD700GT**

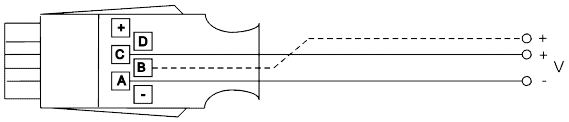
ALMEMO® Connector for Voltage Millivolt



Types:

Model	Meas. Range	Resolution	Order no.
55 mV DC	–10.0 to +55.0	1 µV	**ZA9000FS0**
26 mV DC	–26.0 to +26.0	1 µV	**ZA9000FS1**
260 mV DC	–260.0 to +260.0	10 µV	**ZA9000FS2**

ALMEMO® Connector for Volt DC



Technical Data

Accuracy divider:	only 5.5 / 26 V connector, ±0.1% of measured value Temperature coefficient: <10 ppm/K Nominal temperature: 23°C ±2 K

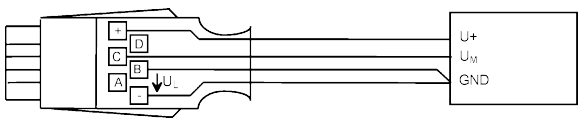
Types:

Model	Meas. Range	Resolution	Order no.
2.6 V DC	–2.6 to +2.6*	0.1 mV	**ZA9000FS3**
5.5 V DC (divider 100:1)	-1.0 to 5.5	0.1 mV	**ZA9602FS4**
26 V DC (divider 100:1)	–26.0 to +26.0	1 mV	**ZA9602FS**
2 mal 26 V DC (2 x divider)	–26.0 to +26.0	1 mV no electrical isolation	**ZA9602FS2**

* Data may vary depending on device; (see data sheet per device)

ALMEMO® Connector for DC voltage difference millivolts / volt

for sensors / transmitters, Supply from ALMEMO® device



Technical Data

Sensor supply	(for voltage see technical data of ALMEMO® device)
Accuracy divider:	only 26V connector ±0,1% of meas. value Temperature coefficient: <10 ppm/K Nominal temperature: 23°C ±2 K

(Connection diagram for connectors with 4 clamps, see next page)

Types:

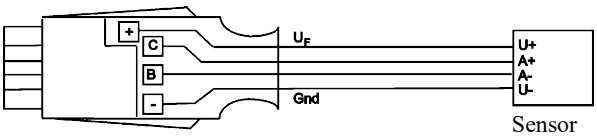
Model	Meas. Range	Resolution	Order no.
55 mV DC	–10.0 to +55.0	1 µV	**ZA9000FS0D**
26 mV DC	–26.0 to +26.0	1 µV	**ZA9000FS1D**
260 mV DC	–260.0 to +260.0	10 µV	**ZA9000FS2D**
2.6 V DC	–2.6 to +2.6*	0.1 mV	**ZA9000FS3D**
26 V DC (divider 100:1)	–26.0 to +26.0	1 mV	**ZA9602FS3**

* Data may vary depending on device; (see data sheet per device)

Input connectors for DC

ALMEMO® Connector for DC Millivolt / Volt Differential

for sensors / transmitters, Supply: 12 V from the ALMEMO® device



Sensor

Technical Data

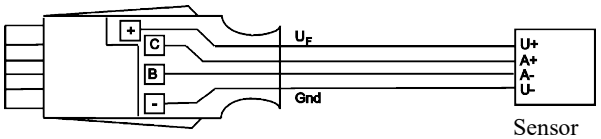
Sensor supply U_F:	12.2 ... 12.5V (15V/24V on request)
Device voltage U_G:	8 ... 12 V
Output current:	100mA at U_G = 9 ... 12V
Accuracy divider:	only 26V connector ±0,1% of meas. value Temperature coefficient: <10 ppm/K Nominal temperature: 23°C ±2 K

Types:

Model	Meas. Range	Resolution	Order no.
55mV DC	–10.0 to +55.0	1 µV	**ZA9600FS0V12**
26mV DC	–26.0 to +26.0	1 µV	**ZA9600FS1V12**
260mV DC	–260.0 to +260.0	10 µV	**ZA9600FS2V12**
2.6V DC	–2.6 to +2.6*	0.1 mV	**ZA9600FS3V12**
26V DC (divider 100:1)	-26.0 to +26.0	1 mV	**ZA9602FS3V12**

* Data may vary depending on device; (see data sheet per device).

for sensors / transmitters, Supply: 5 V from the ALMEMO® device



Sensor

Technical Data

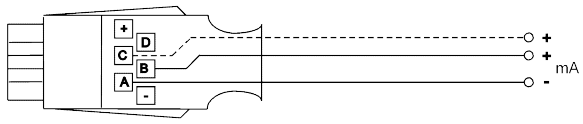
Sensor supply U_F:	5 V ±2 % (max.)
Device voltage U_G:	8 ... 12 V
Output current:	50 mA at U_G = 9 ... 12V
Accuracy divider:	±0,1% v. Mw. Temperature coefficient: <10 ppm/K Nominal temperature: 23°C ±2 K

Types:

Model	Meas. Range	Resolution	Order no.
5.5 V DC (divider 100:1)	-1.0 to 5.5	0.1 mV	**ZA9602FS5V05**

DAkkS- or Factory calibration KE90xx, electrically, for digital measuring module, see Chapter Calibration.
DAkkS calibration meets all the requirements regarding test resources laid down in DIN EN ISO/IEC 17025.

ALMEMO® Connector for DC Current mA



Technical Data

Accuracy shunt:	±0,1% of measured value Temperature coefficient: <25 ppm/K Nominal temperature: 23°C ±2 K

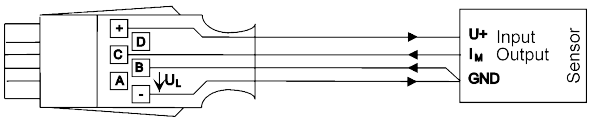
Types:

Model	Meas. Range	Resolution		Order no.
32 mA DC	–32.0 to +32.0*	1 µA		**ZA9601FS1**
4/20 mA DC	0 to 100%	0.01 %		**ZA9601FS2**
2 mal 32 mA DC	–32.0 to +32.0*	1 µA	no electrical isolation	**ZA9601FS3**
2 mal 4/20 mA DC	0 to 100%	0.01 %	no electrical isolation	**ZA9601FS4**

* Data may vary depending on device; (see data sheet per device)

ALMEMO® Connector for DC mA Differential

for sensors / transmitters, Supply from the ALMEMO® device



Technical Data

Sensor supply	(for voltage see technical data of ALMEMO® device)
Accuracy shunt:	±0,1% of measured value Temperature coefficient: <25 ppm/K Nominal temperature: 23°C ±2 K

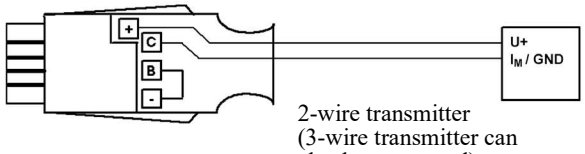
Types:

Model	Meas. Range	Resolution	Order no.
32 mA DC	–32.0 to +32.0*	1 µA	**ZA9601FS5**
4/20 mA DC	0 to 100%	0.01 %	**ZA9601FS6**

* Data may vary depending on device; (see data sheet per device)

ALMEMO® for DC mA Differential

for sensors / transmitters, Supply 12V from the ALMEMO® device



2-wire transmitter
(3-wire transmitter can
also be connected)

Technical Data

Sensor supply U_F: Device voltage U_G:	12,2 ... 12,5V (15V/24V on request) 8 ... 12V
Output current:	100mA at U_G = 9 ... 12V
Accuracy shunt:	±0,1% of measured value Temperature coefficient: <25 ppm/K Nominal temperature: 23°C ±2 K

Types:

Model	Meas. Range	Resolution	Order no.
32mA DC	–32.0 to +32.0*	1 µA	**ZA9601FS5V12**
4-20mA DC	0 to 100%	0.01 %	**ZA9601FS6V12**

* Data may vary depending on device; (see data sheet per device)